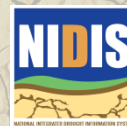


# **National Drought Mitigation Center Decision Support Tools**

**Tonya Bernadt,  
Education and Outreach Specialist  
Mark Svoboda,  
Monitoring Program Area Leader**

*2016 Pacific NW NIDIS RDEWS Meeting, Portland, OR  
February 2 –3, 2016*



# Drought Risk Atlas (DRA):

- Launched March 2014

- **~3000** stations archived

- 139 clusters/regions developed and analyzed
- SPI, SPEI, PDSI, sc-PDSI and Deciles through 2010
- 1 billion indice records
- Weekly/monthly gridded maps for all parameters back to early 1900s (over 500,000 maps)

- Created to answer questions about the **characteristics of drought:**

- Frequency/return periods
- Duration
- Trends
- Intensity
- Spatial extent

➤ **OPEN for business!**  
➤ **Droughtatlas.unl.edu**

The screenshot shows the Drought Risk Atlas website. At the top, it says "Friday, February 01, 2013". The header features the "National Drought Mitigation Center" logo and the title "Drought Risk Atlas". Below the header is a navigation bar with links: Home, Climate, Data, Methodology, About, and Help. A social media bar shows icons for Facebook, Twitter, YouTube, and LinkedIn, along with a "Current Location" dropdown set to "Home". The main content area is titled "Welcome to the Drought Risk Atlas" and includes an "Introduction" section. The introduction text describes the development of the atlas, its purpose, and the data sources. To the right of the text is a "Climate Data Map" showing a map of the United States with various data points. The footer contains contact information for the National Drought Mitigation Center, including the address, phone, fax, and email, as well as the University of Nebraska Lincoln logo and a "NIDIS" logo.

Friday, February 01, 2013

**Drought Risk Atlas**

Home Climate Data Methodology About Help

Current Location » Home

### Welcome to the Drought Risk Atlas

#### Introduction

The idea of updating and expanding a national drought atlas was developed from the original Drought Atlas that was done in conjunction with United States Army Corps of Engineers by Hoskins, Wallis and Guttman in the early 1990s. The original Drought Atlas consisted of those stations in the Historical Climate Network (HCN), numbering approximately 1,000 stations. The period of record at the time was limited, as many stations only had records from the 1940s to present, and these data points were put into their respective climate divisions. A monthly time step was used to calculate the Palmer Drought Severity Index (PDSI). With the new Drought Atlas, bringing precise data down to spatial scales that would allow decision makers to use this tool to better understand drought in their respective region and to make a better decision.

For the new National Drought Atlas, the idea was to expand the data both in the number of stations analyzed and the period of record to include the most complete long-term stations, some of which are not part of the HCN. Using a weekly time-step to calculate multiple drought indices at each station location, not on a climate division scale, allows for a more precise representation of drought histories. The Standardized Precipitation Index (SPI), Palmer Drought Severity Index (PDSI), Deciles, the United States Drought Monitor and other Climatological data are included in the new drought atlas. Along with the Climatological data, gridded maps created on a weekly time-step are available for the entire United States.

**The National Drought Mitigation Center** | 3310 Holdrege Street | P.O. Box 830988 | Lincoln, NE 68583-0988  
phone: (402) 472-6707 | fax: (402) 472-2946 | Contact Us

Home | Climate | Data | Methodology | About | Help  
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**Nebraska**  
Lincoln

**NIDIS**  
NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

# What Questions Will the Drought Risk Atlas Help Answer?

- ▶ How does the drought ***compare historically***?
- ▶ How often does a drought of this magnitude happen? (***frequency/return periods***)
- ▶ When was the last time a drought like this happened? (***analog***)
- ▶ What did the ***spatial footprint*** of the last drought look like? (areal extent via maps)
- ▶ Expand drought planning ***horizons***?
  - Would like to add ***paleo*** (tree rings) data in the future



# Climate Data

Select Atlas Station: 457473 (SEATTLE TACOMA INTL AP)

Select New Station

Station Climate Deciles SPI SPEI PDSI SC-PDSI Drought Monitor Drought Periods Compare Indices Frequencies



## 457473: SEATTLE TACOMA INTL AP

### Latitude

47.444

### Longitude

-122.314

### Elevation (ft)

370

### State

Washington

### County

King

### Climate Division

3

### Time Period

1/1/1948 - 12/31/2012

### Years on Record

64

### Precipitation Only

No

[Download Metadata](#)

The Atlas period of record can and will vary from the ACIS period of record. Stations may

Similar Stations

## Atlas Region



## Related Stations:

(Click to select)

350328: ASTORIA RGNL AP

355971: NEHALEM 9 NE



# Climate Data

Selected Atlas Station: 457473 (SEATTLE TACOMA INTL AP)

Select New Station

Station Climate Deciles **SPI** SPEI PDSI SC-PDSI Drought Monitor Drought Periods Compare Indices Frequencies



## Date

1/1/1948 to 12/31/2012

Period of Record

Station start date: 1/1/1948

## Aggregate

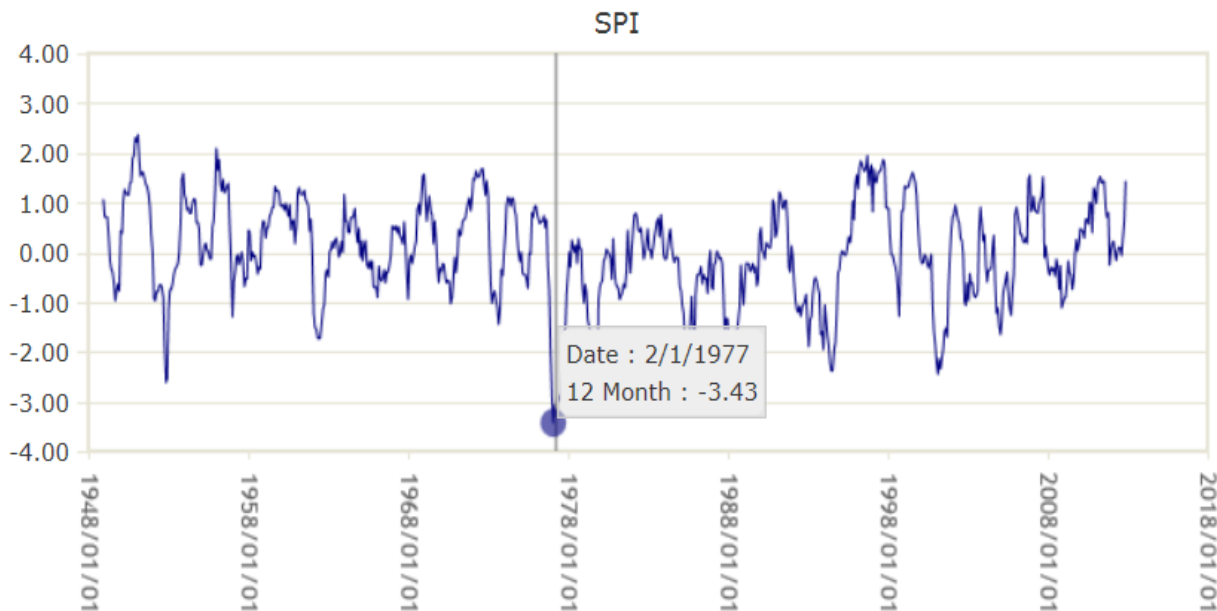
Month

## Timestep

Select one or more timesteps to compare.

1 month  
2 month  
3 month  
4 month  
5 month  
6 month  
7 month  
8 month  
9 month  
10 month  
11 month  
12 month  
18 month  
24 month

Results for **SEATTLE TACOMA INTL AP (457473)** for the 12 Month timestep(s) between 1/1/1948 and 12/31/2012 and aggregated by month.



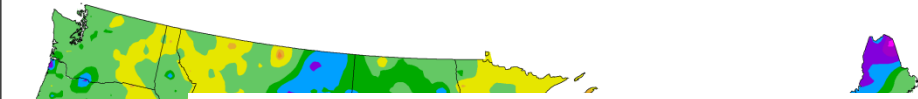
1 Month	5 Month	9 Month	18 Month	60 Month
2 Month	6 Month	10 Month	24 Month	72 Month
3 Month	7 Month	11 Month	36 Month	84 Month
4 Month	8 Month	12 Month	48 Month	96 Month

To zoom in on the chart, click and drag across the chart area. To return to the complete chart, double-click in the chart area.

3 Month SPI for September 2011



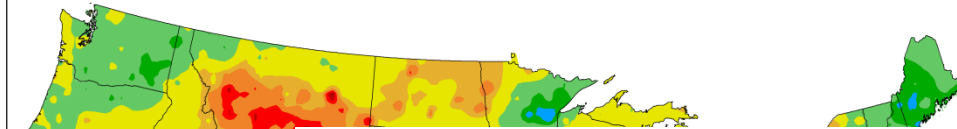
6 Month SPI for September 2011



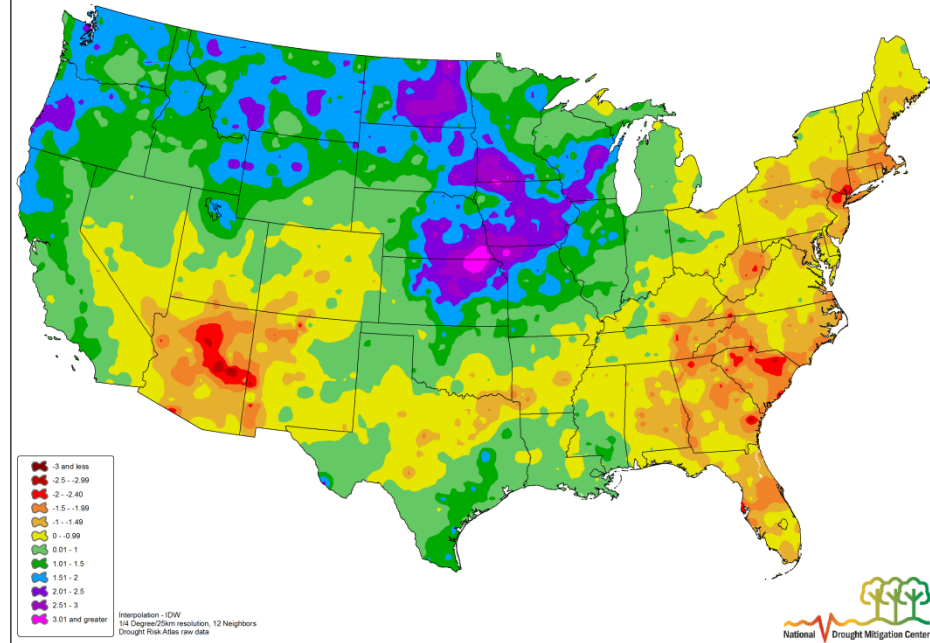
3 Month SPI for September 2012



6 Month SPI for September 2012



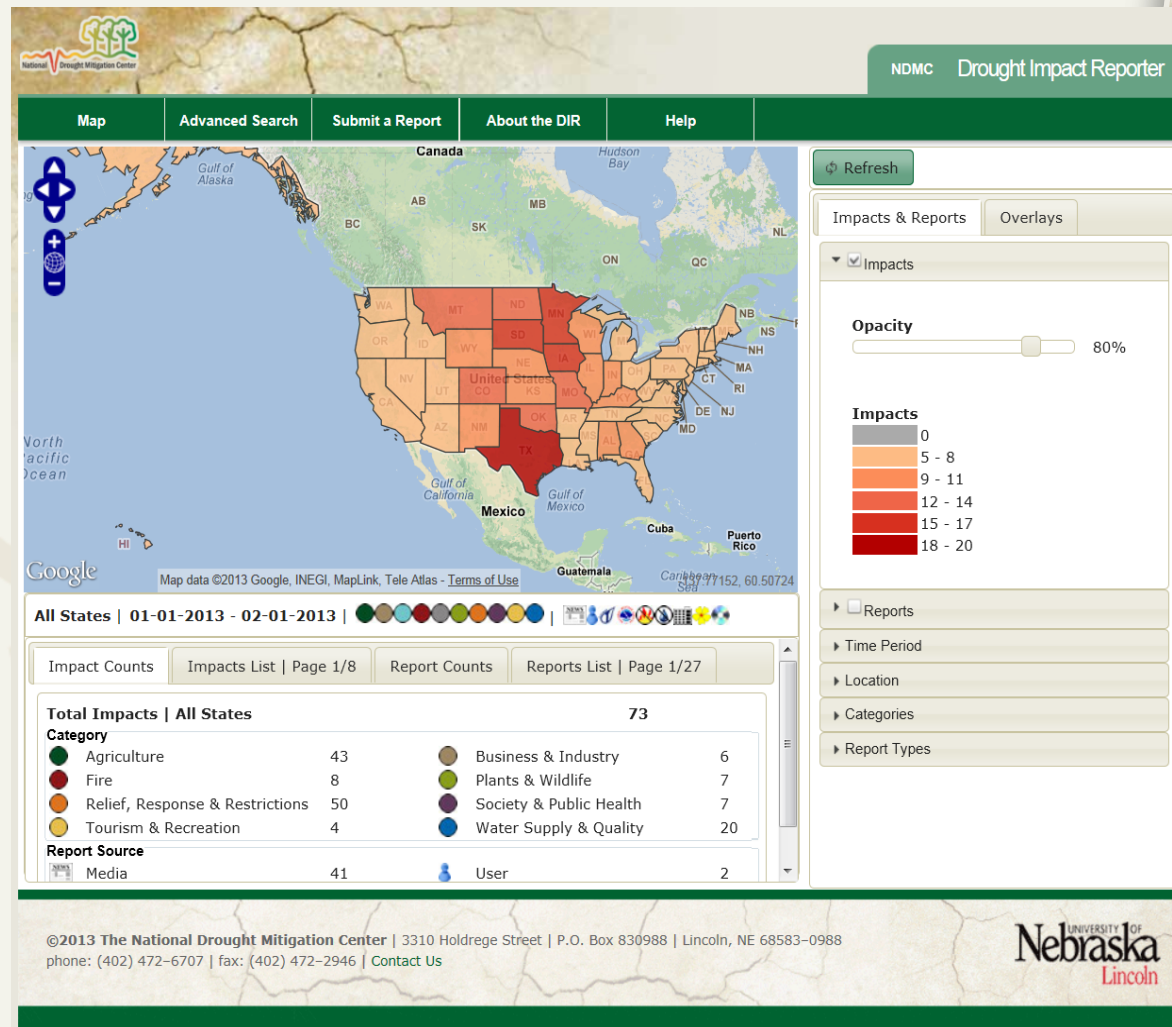
3 Month SPI for July 1993

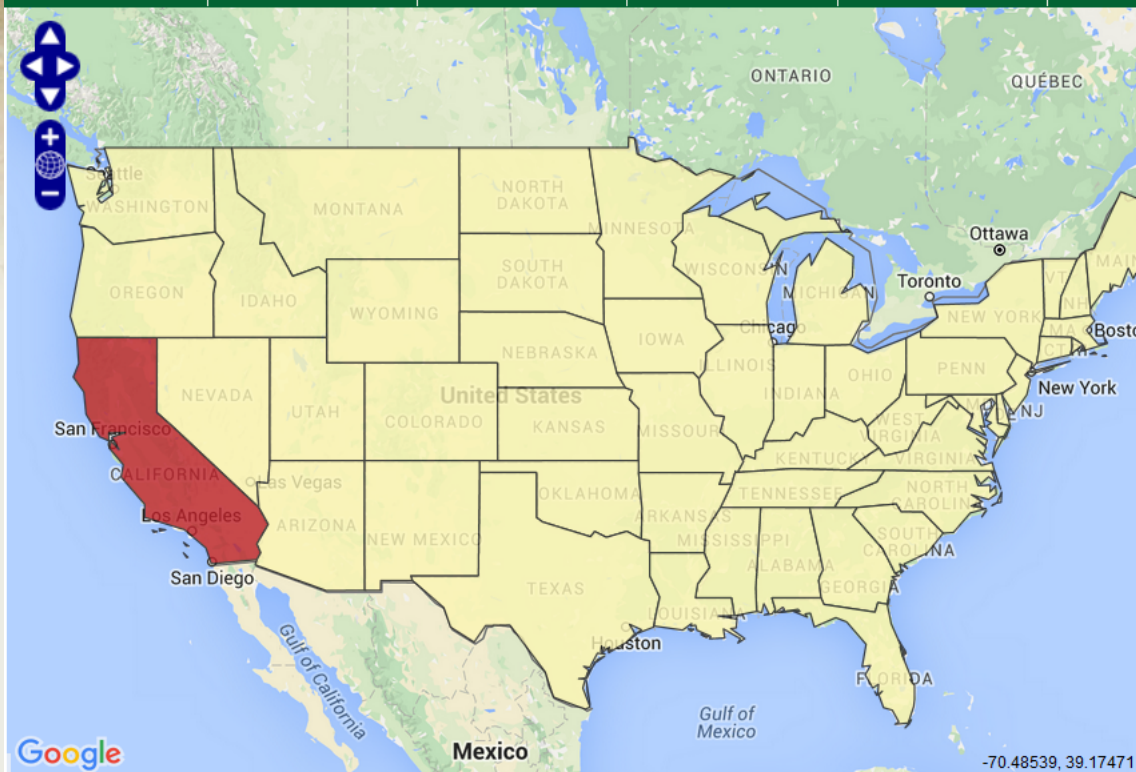


# Drought Impact Reporter (DIR):

- On-line since **2005**
- **28,000+** media reports and **18,000+** impacts in our database to date and growing
- Establishing a **"baseline"** of impacts due to droughts over time
  - "Face of drought"
  - Risk/vulnerability
  - Climate change
- **Ground truth** indices/RS/models
- Quantitative **AND** qualitative
- Direct **AND** Indirect

 **droughtreporter.unl.edu**





Refresh

Impacts &amp; Reports

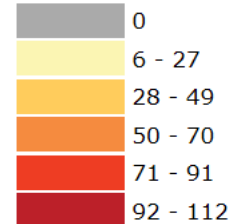
Overlays

☒ Impacts

Opacity

 80%

Impacts


☐ Reports

Time Period

Customize ▾

Start: 10-01-2015

End: 02-01-2016

Location

Categories

Report Types

All States | 10-01-2015 - 02-01-2016 |

Impact Counts

Impact List

Report Counts

Report List

Total Impacts | All States

215

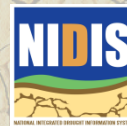
Category

Agriculture	55	Business & Industry	13
Fire	36	Plants & Wildlife	55
Relief, Response & Restrictions	105	Society & Public Health	64
Tourism & Recreation	11	Water Supply & Quality	113

Report Source

Media	185	User	1
OtherAgency	4	CoCoRaHS	30

droughtreporter.unl.edu


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Refresh

Impacts &amp; Reports

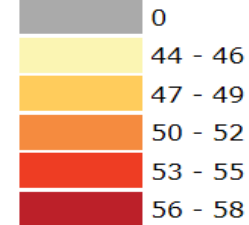
Overlays

Impacts

Opacity

80%

Impacts



### Impacts | Clackamas County, OR 01-31-2015 - 02-01-2016

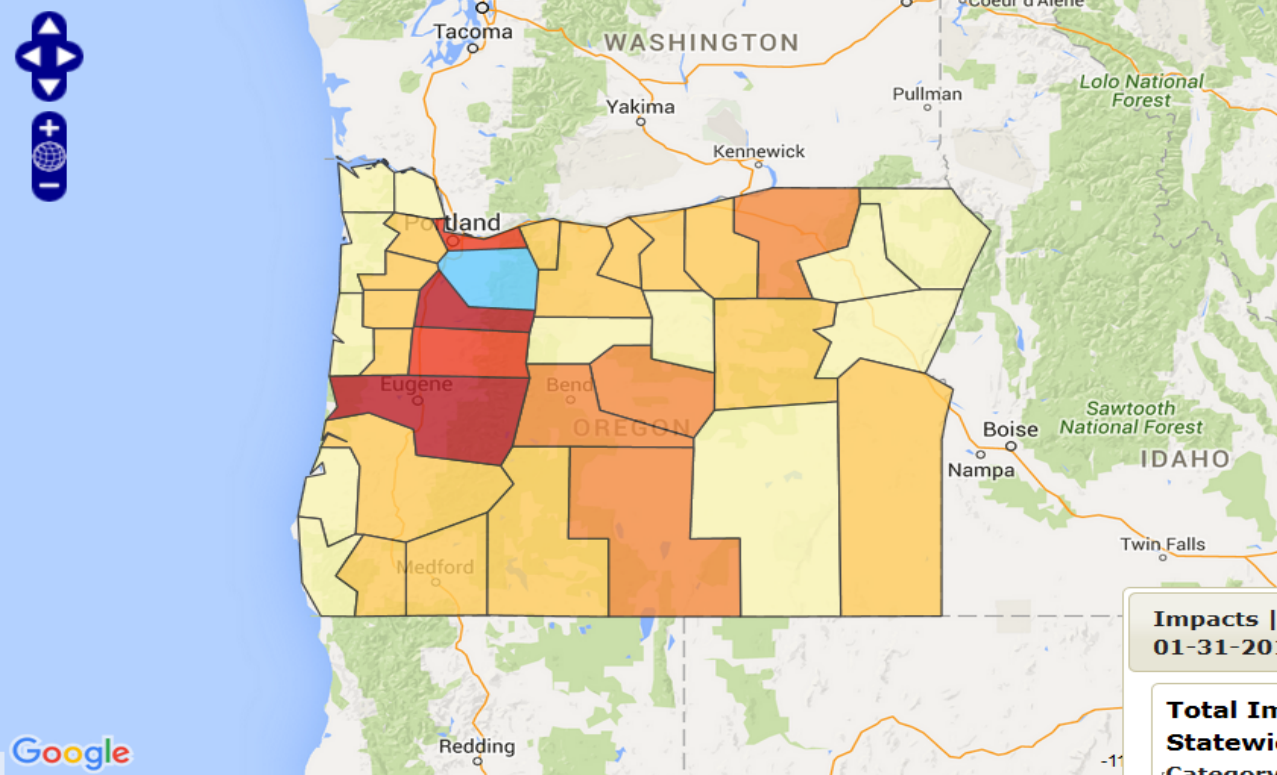
**Total Impacts** 55  
**Statewide Impacts** 44

#### Category

Agriculture	14
Business & Industry	6
Energy	1
Fire	19
Plants & Wildlife	10
Relief, Response & Restrictions	29
Society & Public Health	15
Tourism & Recreation	5
Water Supply & Quality	21

#### Report Source

Media	51
CoCoRaHS	4



Oregon | 01-31-2015 - 02-01-2016 |

Duration: 09-11-2015 - unknown

### Board of commissioners declared state of emergency for Marion County, Oregon



Duration: 09-04-2015 - unknown

### Clackamas County, Oregon, trees dropping leaves



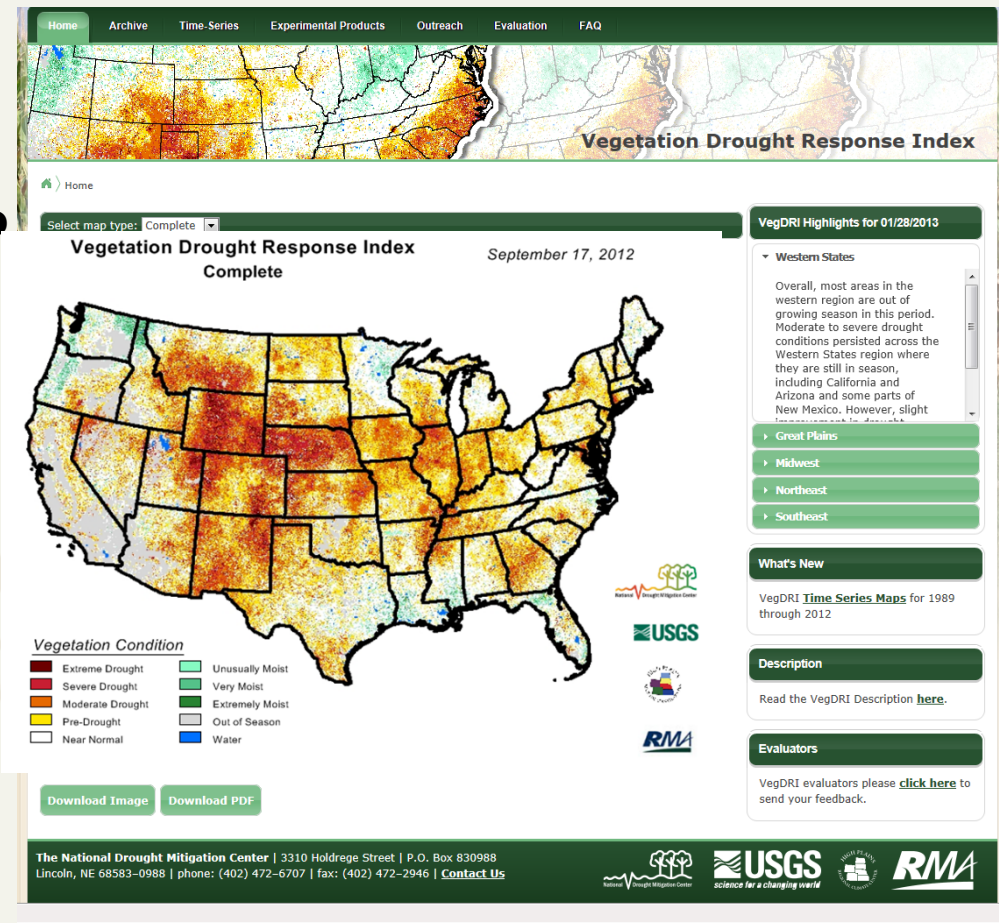
Duration: 06-28-2015 - 08-19-2015

<< < 1 2 3 ... > >>

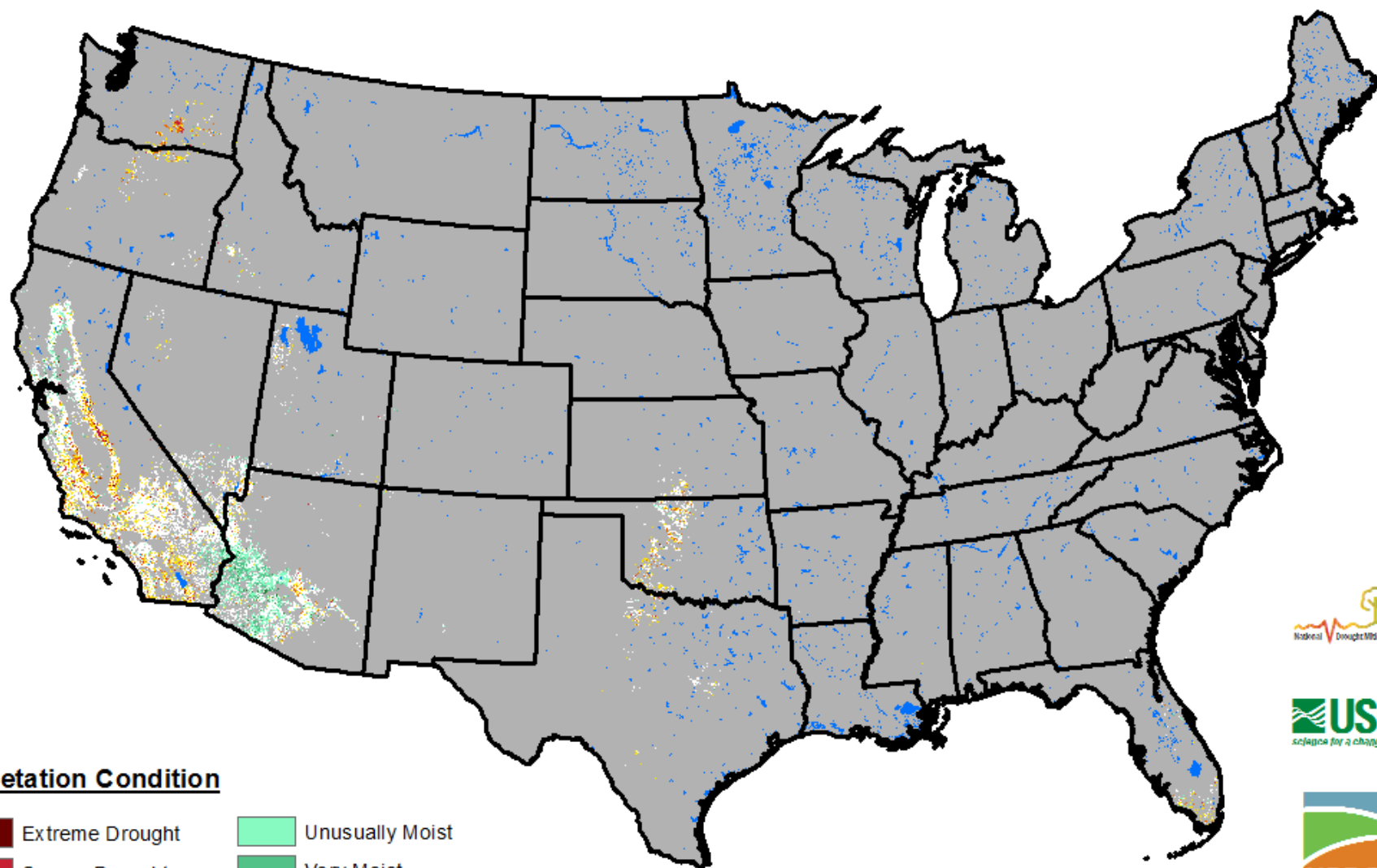
# Vegetation Drought Response Index (VegDRI):

- **Partnership** w/ USGS + HPRCC
- **25+ year archive** back to 1989
- **Augment** *in situ* obs
- **Hybrid** indicator combines satellite, biophysical and climate indicators together to detect **vegetation stress**
- **Weekly (MODIS) & bi-weekly (AVHRR)** production over contiguous U.S.
- **Value-added** products:
  - National, state and sub-state maps
  - Change maps
  - Area statistics
  - Descriptive narrative
  - Animations

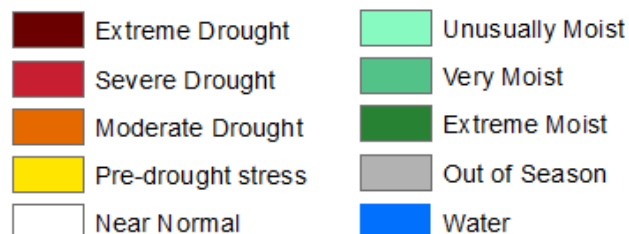
 [veg dri.unl.edu](http://veg dri.unl.edu)



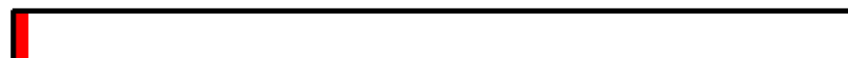
# 2015 Vegetation Drought Response Index (VegDRI)



## Vegetation Condition

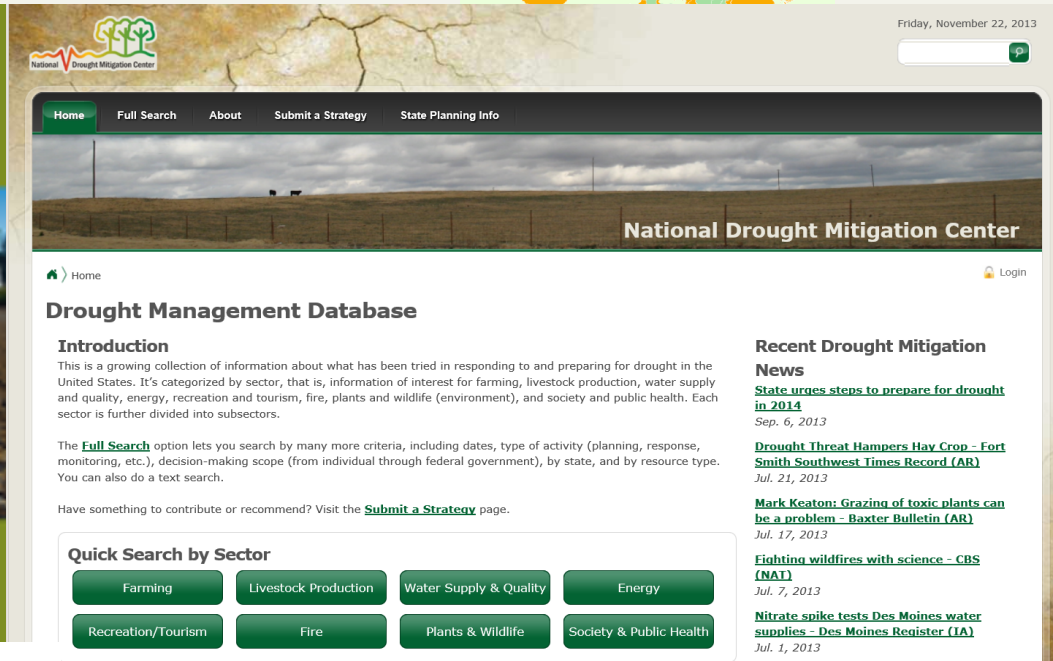
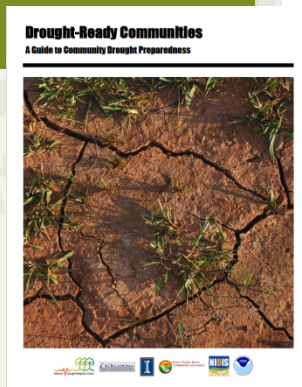
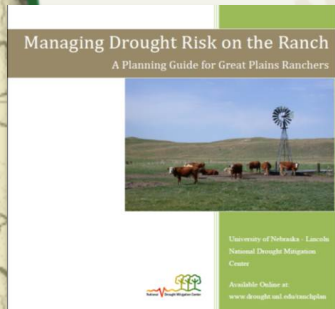
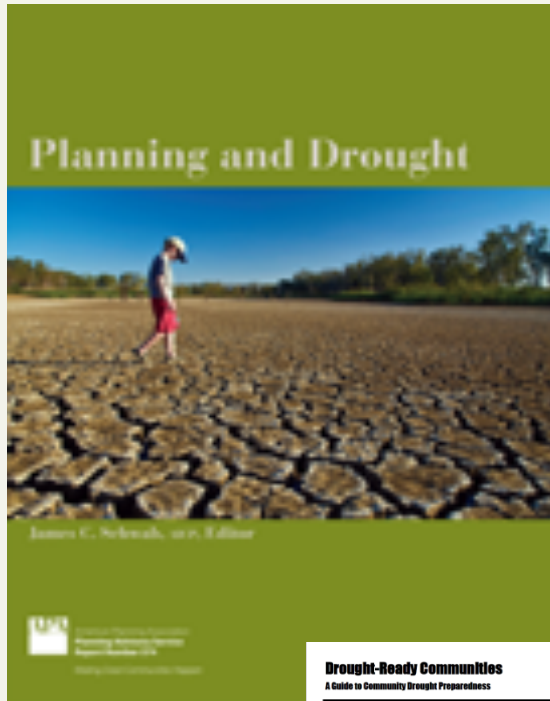


Jan 04





# Planning Tools



State

Community

Individual



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Lincoln





# Drought-Ready Communities

## A Guide to Community Drought Preparedness



LOWER PECOS RIVER  
CORRIDOR ALLIANCE



<http://drought.unl.edu/Planning/PlanningProcesses/DroughtReadyCommunities.aspx>

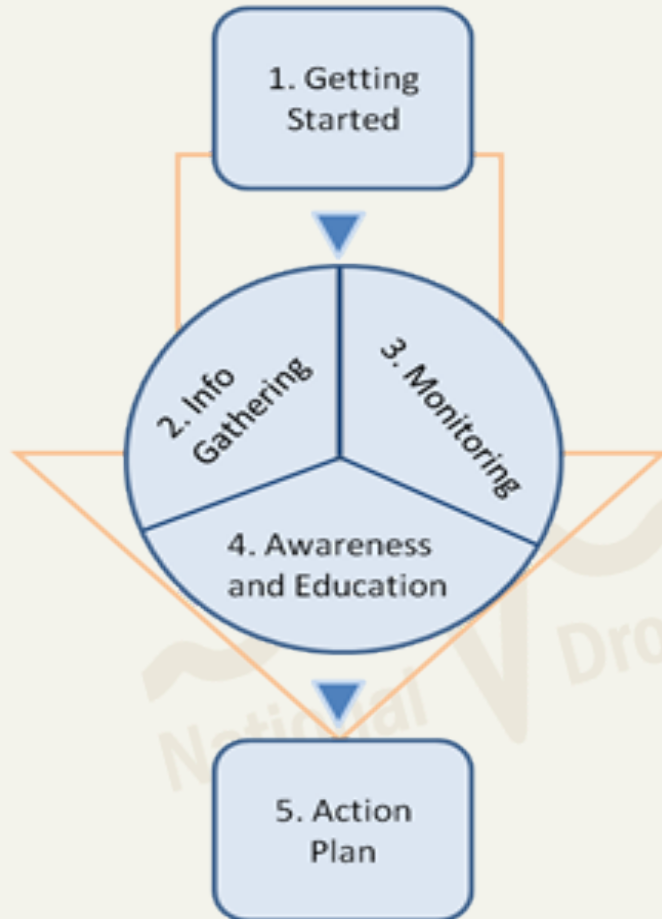


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Lincoln



# Drought Risk

Community  
Stakeholders



Drought-Ready

## Drought Ready Communities Process:

- 1: Invite & Commit
- 2: Gather Information
- 3: Start Monitoring
- 4: Plan for Education & Awareness
- 5: Plan Responses to Reduce Impacts



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# Drought Management Database

## Introduction

This is a growing collection of information about what has been tried in responding to and preparing for drought in the United States. It's categorized by sector, that is, information of interest for farming, livestock production, water supply and quality, energy, recreation and tourism, fire, plants and wildlife (environment), and society and public health. Each sector is further divided into subsectors.

The [Full Search](#) option lets you search by many more criteria, including dates, type of activity (planning, response, monitoring, etc.), decision-making scope (from individual through federal government), by state, and by resource type. You can also do a text search.

Have something to contribute or recommend? Visit the [Submit a Strategy](#) page.

## Quick Search by Sector

[Farming](#)[Livestock Production](#)[Water Supply & Quality](#)[Energy](#)[Recreation/Tourism](#)[Fire](#)[Plants & Wildlife](#)[Society & Public Health](#)

## Featured Strategy

## Featured Strategy

## Recent Drought Mitigation News

[Colorado floats unprecedented plan to tackle water challenges - Denver Post \(CO\)](#)

Nov. 19, 2015

[To save water, an underground movement to bank El Niño's rainfall - Los Angeles Times \(CA\)](#)

Nov. 9, 2015

[To save water, an underground movement to bank El Niño's rainfall - Los Angeles Times \(CA\)](#)

Nov. 9, 2015

[Conservatives push for El Niño capture - Ridgcrest News Review \(CA\)](#)

Oct. 30, 2015

[Water district opens doors to wastewater purification plant - San Jose Mercury News \(CA\)](#)

Oct. 24, 2015

Read more at the [Drought Mitigation News Archive](#)

[wastewater purification plant - San Jose Mercury News \(CA\)](#)

Oct. 24, 2015

Read more at the [Drought Mitigation News Archive](#)

[drought.unl.edu/droughtmanagement](http://drought.unl.edu/droughtmanagement)



# Drought Management Database

## Recreation/Tourism

Drought adversely affects water-related recreation and tourism but it is hard to quantify the effects. Ski resorts can make snow, but water is one of the ingredients that they need. Resorts may also provide alternatives to skiing or water sports, such as shopping.

The [Full Search](#) option lets you search by many more criteria, including dates, type of activity (planning, response, monitoring, etc.), decision-making scope (from individual through federal government), by state, and by resource type. You can also do a text search.

Have something to contribute or recommend? Visit the [Submit a Strategy](#) page.

**Search Results for: Recreation/Tourism**

[Go to the full search](#)[Search by new sector](#)

**Filter by Subsector**

☒ Golf Courses

☒ Ski Resorts

☒ Water Parks

☒ Eco Tourism

☒ Hotels and Restaurants

☒ General Recreation

☒ Policy

Show 

10

 entries

Search:

Title	Date
<a href="#">Socioeconomic Impacts and Adaptation Strategies: Assessing Research on Drought, Climate Change and Recreation</a>	1/1/2012
<a href="#">Dry Ski Slopes: Year Round Skiing without Snow</a>	12/1/2010
<a href="#">Guide to Community Drought Preparedness</a>	7/1/2010
<a href="#">Large Landscape Conservation: A Strategic Framework for Policy and Action</a>	1/1/2010
<a href="#">Pools and Spas: Water Saving Tips and Technologies</a>	1/1/2010
<a href="#">Water-Efficient Restaurant Technologies</a>	1/1/2010
<a href="#">Tournament Players Club in Summerlin, Nevada, naturalizes part of course to reduce water consumption</a>	9/1/2010
<a href="#">Is Water Conservation at Waterparks Considered Oxymoronic?</a>	4/1/2010
<a href="#">Las Vegas drought causing lawns to disappear</a>	3/25/2010

## Recent Drought Mitigation News

[A look at how California golf courses are saving water - San Jose Mercury News \(CA\)](#)

May. 13, 2015

[Drought alters the face of Tahoe tourism - Sacramento Bee \(CA\)](#)

Mar. 22, 2015

[\\$1M bond issue sought to help withered Aqua Caliente Park - Tucson Arizona Daily Star \(AZ\)](#)

Apr. 25, 2014

[Golf courses dealing with brown near their greens](#)

Aug. 27, 2010

Read more at the [Drought Mitigation News Archive](#)

# Drought Management Database

## Water Supply & Quality

City-dwellers generally benefit from water utilities whose job is to smooth out variations in natural water supply. City dwellers may experience drought as needing to restrict outdoor watering to certain days of the week, with indoor restrictions applied if conditions worsen. Landscaping businesses and car washes are typically among those affected by drought in urban areas. Private well-owners in rural areas may need to dig deeper wells or to monitor water quality more frequently during drought.

The [Full Search](#) option lets you search by many more criteria, including dates, type of activity (planning, response, monitoring, etc.), decision-making scope (from individual through federal government), by state, and by resource type. You can also do a text search.

Have something to contribute or recommend? Visit the [Submit a Strategy](#) page.

**Search Results for: Water Supply & Quality**

[Go to the full search](#)[Search by new sector](#)

**Filter by Subsector**

☐ Gmd./Surf. Water Management

☐ Supply Develop./Augment.

☐ Water Quality

☐ Water Allocation

☐ Water Conservation

☐ Water Restrictions/Ordinances

☐ Water Other

☐ Policy

Show 

10

 entries

Search:

Title	Date
<a href="#">Water conservation planning in California irrigation districts</a>	8/29/2013
<a href="#">Completed project on the White River in Arkansas ensures minimum flow for fish</a>	8/22/2013
<a href="#">Interstate Commission on the Potomac River Basin Drought Exercise</a>	8/21/2013
<a href="#">How 10 Western Cities Are Dealing with Water Scarcity and Drought</a>	8/2/2013
<a href="#">Texas Water Development Board Water Conservation Best Management Practices</a>	7/11/2013
<a href="#">National Water Research Institute</a>	7/5/2013
<a href="#">Strategies for small to mid-size public water systems</a>	7/1/2013
<a href="#">Water Banking: What is it and how does it work?</a>	6/29/2013
<a href="#">Food Processing Industries: Water Use Efficiency Ideas</a>	5/10/2013

## Recent Drought Mitigation News

[Colorado floats unprecedented plan to tackle water challenges - Denver Post \(CO\)](#)

Nov. 19, 2015

[To save water, an underground movement to bank El Niño's rainfall - Los Angeles Times \(CA\)](#)

Nov. 9, 2015

[To save water, an underground movement to bank El Niño's rainfall - Los Angeles Times \(CA\)](#)

Nov. 9, 2015

[Conservatives push for El Niño capture - Ridgcrest News Review \(CA\)](#)

Oct. 30, 2015

[Water district opens doors to wastewater purification plant - San Jose Mercury News \(CA\)](#)

Oct. 24, 2015

Read more at the [Drought Mitigation News Archive](#)



## Managing Drought Risk on the Ranch

Overview

Login

Drought is a normal part of climate...it will happen again. Fortunately, there are things you can do before, during, and after drought to reduce your risk. Ranchers are increasingly implementing new ways to better prepare for and respond to drought.

The information, strategies and resources on this site are designed to provide livestock producers in the [Great Plains region](#) with information on how to incorporate management strategies to reduce the threat drought poses to livestock and forage operations.

## Managing Drought Risk on the Ranch: Great Plains Examples

### South Dakota



[Daybreak Ranch](#)  
(Central)

### Nebraska



[Tippets-Myers Ranch](#)  
(Western Sandhills)  
[Reed Hamilton Ranch](#)  
(Sandhills)  
[Shamrock Ranch](#)  
(Southwestern)

### Kansas



[Alexander Ranch](#)  
(South Central)  
[Adams Ranch](#)  
(North Central)

### Colorado

[Welch Ranch](#)  
(Southern)

### Texas

[Johnson Ranch](#)  
(West Central)

### Where to Start

[Start here if you are in a drought](#)

[Start here if you are recovering from a drought](#)

[Start here if you are preparing for a drought](#)

[Write a Drought Plan](#)

[How to use this site](#)

### Drought Conditions

[U.S. Drought Monitor](#)

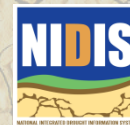
[Water Year Precipitation \(Oct. 1st to present\)](#)

[Precipitation - past 30 days](#)

[Weather forecast](#)

[Long Term Outlook](#)

- **Drought planning process and web-based educational resource for forage and rangeland producers**
- Initiated with RMA funding in 2006
- Collaborators include SDSU, TX A&M, UNL, and ranchers and advisors from SD, NE, KS, CO, TX
- [www.drought.unl.edu/ranchplan](http://www.drought.unl.edu/ranchplan)



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# Writing a Ranch Drought Plan

## Write a Drought Plan

Many range publications recommend that managers develop drought plans. The planning steps provided here have been developed by ranchers throughout the Great Plains, as well as forage, range, and agricultural economics specialists. These steps will help range managers develop a solid plan of action for situations (such as drought) that lead to forage shortages.

## Drought Planning Steps

Step 1: [Form Planning Team](#)

Step 2: [Set Ranch Vision and Strategic Objectives](#)

Step 3: [Take Inventory](#)

Step 4: [Identify Critical Dates and Target Conditions](#)

Step 5: [Learn to Monitor Resources](#)

Step 6: [Develop Strategies for Preparing for Drought, Responding to Drought, and Recovering from Drought](#)

Step 7: [Implement and Evaluate the Plan](#)

## Sample Drought Plans

Colorado

[Southern Colorado Case Study - Welch Ranch](#)

Kansas

[South-Central Kansas - Alexander Ranch](#)

[North-Central Kansas - Adams Ranch](#)

Nebraska

[Southwest Nebraska - Shamrock Ranch](#)

[Western Nebraska Sandhills - Tippetts-Myers Ranch](#)

[Nebraska Sandhills - Reed Hamilton Ranch](#)

South Dakota

[Central South Dakota - Daybreak Ranch](#)

Texas

[West-Central Texas - Johnson Ranch](#)

[Submit a Drought Plan Example](#)

- Drought planning process developed with input from rancher and advisor stakeholders
- Interviews and participatory workshop resulted in a recommended process involving 7 planning steps
- Website includes links to resources to help with drought planning, as well as sample drought plans by producers across the Great Plains



# 2012

## Managing Drought Risk on the Ranch

A Planning Guide for Great Plains Ranchers



University of Nebraska - Lincoln  
National Drought Mitigation  
Center

Available Online at:  
[www.drought.unl.edu/ranchplan](http://www.drought.unl.edu/ranchplan)



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THE RANCH DROUGHT PLAN	8
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STEP 2: IDENTIFY RANCH VISION AND OBJECTIVES	9
STEP 3: INVENTORY RANCH RESOURCES	10
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This guide to help rangeland managers better prepare for and manage drought is a project of the National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln (UNL) and other collaborators at UNL, South Dakota State University, and Texas A&M Kingsville. This project was made possible through funding from the U.S. Department of Agriculture Risk Management Agency.

Much of the content of this handbook and the companion website was developed with information provided by Dr. Pat Reece, Professor Emeritus at UNL and now owner/consultant with Prairie Montane Enterprises, LLC.

The handbook and website were developed by, and will be maintained by, the National Drought Mitigation Center. Comments and questions about the handbook and website can be directed to the NDMC at [ranch\\_ndmc@unl.edu](mailto:ranch_ndmc@unl.edu) or 402-472-6781.

<http://drought.unl.edu/ranchplan>





# Contact Information:

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**402-472-2712**

**Mark Svoboda**  
**[msvoboda2@unl.edu](mailto:msvoboda2@unl.edu)**  
**402-472-8238**

**National Drought Mitigation Center**  
**School of Natural Resources**  
**University of Nebraska-Lincoln**



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